National Institute of Environmental Health Sciences

Impact of heat on mortality in 15 European cities: Attributable deaths under different weather scenarios

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Abstract:

BACKGROUND: High ambient summer temperatures have been shown to influence daily mortality in cities across Europe. Quantification of the population mortality burden attributable to heat is crucial to the development of adaptive approaches. The impact of summer heat on mortality for 15 European cities during the 1990s was evaluated, under hypothetical temperature scenarios warmer and cooler than the mean and under future scenarios derived from the Intergovernmental Panel on Climate Change Special Report on Emission Scenarios (SRES). METHODS: A Monte Carlo approach was used to estimate the number of deaths attributable to heat for each city. These estimates rely on the results of a Bayesian random-effects meta-analysis that combines city-specific heat-mortality functions. RESULTS: The number of heat-attributable deaths per summer ranged from 0 in Dublin to 423 in Paris. The mean attributable fraction of deaths was around 2%. The highest impact was in three Mediterranean cities (Barcelona, Rome and Valencia) and in two continental cities (Paris and Budapest). The largest impact was on persons over 75 years; however, in some cities, important proportions of heat-attributable deaths were also found for younger adults. Heat-attributable deaths markedly increased under warming scenarios. The impact under SRES scenarios was slightly lower or comparable to the impact during the observed hottest year. CONCLUSIONS: Current high summer ambient temperatures have an important impact on European population health. This impact is expected to increase in the future, according to the projected increase of mean ambient temperatures and frequency, intensity and duration of heat waves.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2, SRES B1

Other Climate Scenario: A1B

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature: ☑

resource focuses on specific type of geography

Ocean/Coastal, Urban

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Greece; Spain; Hungary; Ireland; Finland; Slovenia; United Kingdom;Italy; France; Czech Republic; Sweden; Switzerland

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Morbidity/Mortality

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Outcome Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Medium-Term (10-50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content